

## 2

### The "Political Ecology" of Amazonia

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The growing concern over the negative environmental impact of recent expansion of population and economic activity into the Brazilian Amazon basin has raised important questions about the relationship between the natural environment and socioeconomic behavior. Fiscal policies designed to attract the expertise of private firms to the Amazon region have induced rampant land speculation and the rapid expansion of unproductive pastures rather than the expected "rational" use of natural resources. Small-farmer colonization schemes, plagued by institutional failures and market bottlenecks, have been unable to absorb a significant portion of the Brazilian migrants seeking to settle the region. Land titling procedures remain confused, and, as a result, ranchers, squatters, and miners use indiscriminate forest removal as a means to assert their claims. The increasing rate of deforestation in Brazil is especially worrisome in light of the importance of tropical forests as a source of biological diversity and of potentially useful products. Persistent violence and conflicts over land, and a growing pattern of concentration of landholdings, have repeatedly required military intervention to prevent open warfare. Indigenous groups and other long-standing inhabitants of the region have been on the losing side of most of these confrontations. Not only are their lands being taken away, but their well-adapted resource management strategies have been ignored by development planners. Attempts to protect indigenous groups and to preserve portions of the forest from intrusion have met with modest success in Brazil. At the same time, continued frontier expansion poses a formidable challenge to those who seek to minimize the disruption of the Amazonian ecosystem. Why have so many development plans and protective environmental efforts gone awry?

We can begin to answer this question by noting that the goals of environmental policy (conservation and long-term sustainability) are fundamentally at odds with the goals of expanded production and short-term accumulation. Unmitigated ecological disasters are often hailed as resounding economic and political successes. By the same token, such resource man-

agement projects as conservation efforts that strictly "quarantine" the natural environment, thereby depriving people of economic sustenance and businesses of profit, may entail unacceptable, and potentially disruptive, social and political costs.

In the socioeconomic and political context within which resource management projects must be carried out, the principle of private profit and expanded production far outweighs that of biophysical sustainability and environmental conservation. Hence, it is hardly surprising that the goals of ecologically sound projects premised on assumptions of sustainability are consistently subverted by the mechanics of a social system based on the laws of accumulation. It follows, also, that explanations for this "subversion" cannot be attributed solely to the familiar list of factors: insufficient knowledge and technical training, poorly informed public policy, the self-interest of particular social groups, population increase, and so on. Although these considerations are certainly relevant to project failure, they are themselves the result of much broader phenomena. As we will argue in this chapter, a society's prevailing form of economic production and class structure, and the manner in which diverse economic groups battle for ideological and policy advantage within the state apparatus, are crucial considerations in the process of designing resource management projects and in formulating strategies to carry them out.

In the first section we present a model of the sociopolitical system that can be used to analyze the processes pertinent to understanding the human use of natural resources. The framework, drawn from the perspective of political economy, shows the relationship between surplus production, social class, the function of the state in promoting private accumulation, and the role of ideology in public discourse and development planning. In order to demonstrate the relevance of these concepts and relationships to the study of resource management, we extend the political economy framework to address the specific issue of land use patterns in the Brazilian Amazon. This approach, which we have called "political ecology," illustrates how economic and political processes determine the way natural resources have been exploited in frontier regions of northern Brazil.<sup>1</sup>

The concluding section applies these insights to the practical problem of how to create programs to alter the ways in which resources are exploited. We argue that both the design of intervention projects and the strategies to implement them must be formulated on the basis of a thorough assessment of a society's overall political economy. We propose that the design of policy interventions follow an explicit agenda by which the desiderata of a proposed resource-use model (based on an assessment of both ecological and social factors) is weighed against what can be feasibly accomplished in a given setting (based on an analysis of existing resource-use systems, differences in socioeconomic and political power, and the conflicts and trade-offs these imply).

### The Political Ecology of Amazonian Development

Distinct forms of sociopolitical organization are based on different production principles. For our purposes two types are of special importance: those based on subsistence, or simple reproduction, and those based on expanded production and private accumulation. The relevance to political ecology stems from the markedly different implications the two forms of organization have in terms of human appropriation of the natural environment.

#### Simple Reproduction

In some societies, such as certain indigenous groups in Amazonia, the goal of production is subsistence. Such groups operate beyond the reach of the market economy and produce no significant surplus. Internal social differentiation follows kinship and distinctions of age and gender that together define a division of labor legitimated by the norms, values, and beliefs of a well-adapted world view (culture). In some cases ceremonial obligations (e.g., communal feasts) act as "leveling mechanisms" that impede individual accumulation. In some hunting and gathering societies people shun the accumulation of material possessions for the simple reason that it hinders efficient mobility. In nearly all instances exchanges through kinship networks serve to redistribute goods throughout the group, thereby enhancing collective survival.

Peasant producers, though connected to national markets, follow a similar subsistence strategy. The basic organizing principle is the maximization of security and the minimization of physical expenditure (Chayanov 1966; Forman 1975). Peasants trade or sell a portion of their crop to obtain or purchase necessities that they cannot themselves produce. Labor inputs are calculated on the basis of expected family needs, which often contain a monetary referent. But the acquisition of cash is destined primarily for household consumption requirements rather than for purposeful investment in expanded production for profit.

Between peasant and Indian lies the purely Amazonian figure of the *caboclo*—in Spanish, *ribereño* or *mestizo* (Moran 1974; Wagley 1968)—a racially mixed population that grew with the migration into the region during the rubber boom. The traditional *caboclo* subsistence pattern combines the harvest of forest products with some agriculture, hunting, and fishing. Links to the market exist but are mostly based on the *aviamento* system. Creditors, or *aviadores*, advance food, tools, gunpowder, and goods such as kerosene and salt in exchange for rubber or Brazil nuts.

Sustenance strategies developed by subsistence producers may be simple in their goals but they are highly complex in their interaction with the natural environment. For example, the Northern Kayapo in Brazil recognize eight major ecological zones and two types of transitional zones near their main village (Posey 1985). Similarly, the Panaillo Shipibo of Peruvian Amazonia, studied by Bergman (1980), use nine biotopes for their diverse

forms of agriculture and other zones for fish and game. This diversity minimizes the potential for environmental degradation and is well suited to tropical rain forest ecology. Practiced over extensive territories under conditions of low population density, these systems have been sustainable over hundreds of years. Because subsistence needs are finite, simple technology is used and population size is small, and because kin-based systems of exchange ensure the provision of society as a whole, the human impact on the natural environment is minimal.

Subsistence societies, whose activities have only a minimal impact on the natural environment, approximate steady-state economies. This need not imply that indigenous groups are in complete harmony with all aspects of the ecosystem. The very diversity of their strategies implies a wide range of environmental disturbances and is likely to lead to undue pressure on specific resources at specific moments. The relatively small scale of the economy, however, impedes wholesale disruption of the recycling process that is central to the stability of the tropical forest ecosystem.

The traditional riverside dweller, or *caboclo*, shares with indigenous adaptations a finely tuned diversity developed over centuries of occupation of the Amazonian ecosystem. In one study, for example, *caboclos* recognized at least 40 different local "resource units" within which they differentiated "vertical levels" of terrestrial, arboreal, and aquatic resources (Parker et al. 1983:183). As late as 1970, more than half the population of Brazil's Amazon region still depended on a combination of forest extraction, horticulture, hunting, and fishing for their sustenance (Pinto 1980:87). *Caboclo* social relations, however, are different from those found in indigenous systems. Isolated *caboclo* families or small clustered settlements are the rule rather than communal labor and land allocation systems like those of indigenous kin and clan groups.

Peasant producers (as distinct from the traditional *caboclo*) are recent newcomers to Amazonia, primarily attracted to the region by road construction projects that opened up new territories for occupation. As outsiders, they bring to the region agricultural practices familiar to their places of origin but sometimes poorly adapted to the intricacies of rain forest ecology. More importantly, however, their relationship to natural resources is subject to severe socioeconomic and political constraints within which they struggle to survive on the frontier. The concentration of land ownership, for example, relegates small farmers to plots smaller than subsistence size, causing them to overcrop their meager holdings out of sheer necessity. This tendency is exacerbated by economic pressures deriving from credit systems, exploitation by middlemen in the commercialization process, and the unequal terms of trade inherent in the market linkages to the larger economy (Collins 1986). Similarly, the lack of secure title and the precarious *de facto* hold over land mean that reinvestment in erosion control, fertilizer, and irrigation are both costly and irrational (see the discussion of class conflict below). Contrary to official planning documents, such as Brazil's *Second Development Plan for Amazonia* (SUDAM 1976), peasant producers are not inherently "predatory."

Their relationship to land and natural resources is socially, economically, and politically constrained.

To summarize, indigenous groups, caboclos, and peasants share, to a greater or lesser extent, a production system oriented primarily to simple reproduction. Beyond this general similarity, important distinctions exist with regard to their respective appropriation of natural resources. The complex adaptive strategies developed by indigenous peoples who have little connection to the market lie at one end of the continuum. At the other are peasant producers, with more specialized production methods and stronger ties to market networks and the money economy, while traditional Amazonian caboclos and market-oriented native producers fall somewhere in between.

Pressures for surplus production immediately disrupt the balance that characterizes production systems geared to simple reproduction. For example, the demand for turtle eggs and meat during the colonial period destroyed the traditional mechanisms by which local populations had previously managed the turtle population (Smith 1974). Rapid depletion of turtle and manatee populations not only deprived the indigenous population of sources of oil and meat, but also seriously disrupted the riverine ecosystem (Bunker 1985:64). The influx of migrants during the rubber boom at the turn of the century led to increased pressures for agricultural production, and pushed inhabitants from their floodplain settlements to the dry *terra firme*, a more fragile ecosystem. The intricate technologies by which they had managed the floodplains (*várzea*) were virtually lost (Ross 1978). More recently, demand for animal pelts threatened jaguar and cayman populations as indigenous and caboclo populations responded to outside market opportunities.

#### *Expanded Production and Private Accumulation*

Once an increase in labor productivity makes a surplus possible, the stage is set for a struggle over how this surplus will be distributed. We speak of a class society when one subgroup of the population relies on institutionalized mechanisms (as opposed, say, to plunder) to garner surplus that they did not themselves produce. Social classes are thus defined by the particular way surplus product is created and accumulated, the structure of which is historically variable. Slavery, medieval feudalism, and modern capitalism have in common the existence of surplus, yet in each case the system of production and distribution—and, therefore, the society's class structure—are markedly different.

Unlike other forms of social organization, capitalism is an inherently expanding system. The engine of this continual expansion is the market competition between producers who privately own the means of production. When one producer adopts a new technology, others are forced to follow suit if they are to survive in the marketplace. In this way there is built into the system a constant need for individual firms to advance technology and

productivity, tendencies which, in a competitive market environment, necessarily spread throughout the economy.

Expanding capitalist production tends to subordinate, and in some cases eradicate, noncapitalist forms. As noted earlier, the penetration of market linkages into indigenous societies violates the principle of simple reproduction and can disrupt the delicate balance noncapitalist groups have with the natural environment. Similarly, the ever-increasing quantity of cheap commodities produced by the dynamic capitalist sector undermines the economic viability of artisans, craftsmen, and small farmers. These structural transformations can have negative implications for land use when peasant producers are relegated to plots too small to provide for subsistence needs, and when they are forced to over-exploit their meager resources merely to stay alive (see M. Painter in this volume).

Within capitalist firms the logic of expanded production is inherently degrading to land and other resources. So long as governments do not interfere through regulatory mechanisms, the natural environment can (indeed, must) be exploited for maximum short-term gain. This is especially true in Amazonia where the viability of long-term investments is in doubt. Ranchers destroy the tropical forest with little regard for wildlife or indigenous groups. Sawmills harvest only highly valuable mahogany trees, causing ranchers and peasant farmers simply to burn all other types of wood. Mining companies, as well as individual placer miners, pollute streams in the search for gold and other valuable metals.

The point is that environmental degradation is an eminently rational process, at least insofar as the short-term needs of capital are concerned. It follows that attempts to intervene in the manner in which natural resources are exploited run counter to the interests of powerful economic groups. Such groups wield considerable influence within the legislative and planning bureaucracies of the state. Dominant economic groups also command the financial and intellectual resources to mold public opinion and to limit the universe of political discourse to a range of options favorable to their interests. We can therefore anticipate that resource-management projects, or environmental policies that increase production costs to private capital (and hence reduce the rate of profit), will meet with predictable opposition from the representatives of particular sectors of the economy and from their spokesmen in the political arena.

Identifying the class structure of a society or a regional economy is thus more than a taxonomic exercise. Such an analysis reveals, among other things, the constellation of interest groups with which any intervention policy must contend. As we will argue in the conclusion, the ability to recognize sources of political opposition (and support) is essential to formulating and implementing projects designed to alter existing forms of resource use.

#### *Social Class and Conflict*

In nonmonetary, kin-based indigenous societies oriented to subsistence production, land is held communally and cannot be sold to outsiders. Because

of the diversity of land-use strategies, the size of their territories must be far larger than the amount equivalent to one farm plot per family. Tribal lands are increasingly coveted as the frontier expands into the region. The technical complexity of indigenous resource management goes unappreciated because it does not produce a significant market surplus. Non-natives thus complain that indigenous groups monopolize enormous land areas on which they produce nothing of use to the nation. Even with the official protection of Brazil's Indian Statute, passed in 1973, tribal territories continue to suffer incursions by squatters, ranchers, loggers, miners, road construction crews, and others. Yet the reserves on which the indigenous groups are now confined are far more limiting than the vast areas over which many of them traditionally moved. As they are forced to adopt more sedentary, less diverse adaptive systems, Indians may begin to lose the capacity for long-term sustainability.

Other traditional Amazonian social groups, such as caboclos, are also threatened by the struggle over land. While their ecology has much in common with indigenous societies, caboclos lack the cultural and political distinctiveness that has constituted a measure of defense (however limited) for native groups. Caboclos are invisible within the "empty spaces" development policy seeks to occupy, and their vast ecological knowledge is ignored in colonization attempts (Moran 1981). Although often caboclo populations have occupied riverside lands for years, even for generations, they are so far removed from the legal requirements to make good their claims that they are seldom able to defend them from outsiders. Struggles over access to Amazonian land are therefore likely to replace the diversity of caboclo adaptations with the simplified agricultural systems imported from other parts of Brazil.

An even more direct threat to Amazonian forests emerges from the struggle for land between squatters and investors. For both, clearing the land of forest is the first step to establishing land rights. This is the most rational strategy even when the future of any productive endeavor is in doubt. The fact that the two groups compete for access to the same areas not only increases social tension and violence in frontier areas, it also accelerates the rate of deforestation as claims are continually pushed forward. It is in this case that the environmental effects of class conflict in Amazonia are most dramatic.

The "rationality" of rampant land clearing by investors and squatters is based on the logic of economic behavior that characterizes each of the two systems of production. On the one hand, capitalist investors have moved into the Amazon from southern Brazil, attracted by the generous program of fiscal incentives offered by the government and by the prospect of acquiring large amounts of land as a hedge against inflation, a means of diversifying their portfolios, and an outlet for profits that could not be remitted abroad. Conditions for investors were so attractive that the profits to be made bore little relationship to productive investments. For these "speculative fronts" (Sawyer 1984:194), land as a means of production was

secondary to its function as a "reserve of value" and as a means of obtaining access to other forms of wealth associated with land in the Amazon region: lumber, minerals, cheap credit, and fiscal incentives (Silva 1980:47). Since the land itself rapidly increased in value regardless of its productivity, the seemingly reckless forest destruction was for these investors the most rational economic strategy.

The small farmer migrants were primarily attracted by the prospect of owning their own land. They came from other regions of Brazil where profound changes in agricultural systems were under way: expulsion from earlier frontier areas, the breakdown of traditional tenant and sharecropping relationships, the increasing mechanization of agriculture, and the concentration of landownership. Most have few other options but to move to the frontier, clear a plot of land, and hope to hold on to it. Yet in the history of frontier movement in Brazil, a "demographic" front of small farmer migrants is later dispossessed by the "economic" front of investors who appropriate the value created by these farmers (Foweraker 1981). Selling and moving on, in response to threats from the other party in land conflicts, constitutes the so-called "land rights industry" (*indústria da posse*) that is the only way migrants can accumulate cash in the frontier setting. Myers (1980) refers to these migrants as "shifted cultivators" and labels them the greatest threat to tropical forests because of their numbers. As wave follows wave in particular areas, land is cleared successively until the possibilities of forest regeneration are remote. The rational behavior of these migrants, within the limited range of options open to them, not only degrades the forest environment but undermines the prospects for their own productive endeavors. Strategies to improve the collective capabilities of smallholders to manage their resources and defend their tenure rights could help to stabilize small-scale agriculture in already occupied areas. But agrarian reform, and other measures carried out beyond Amazonia's borders, would be the most effective policies to relieve pressures on forest lands (Goodland 1980; Spears and Ayensu 1984:16-17).

#### *Markets and Surplus Extraction*

While local and regional markets may foster economic self-sufficiency of peasants and natives, national and international markets often exhibit a "boom or bust" pattern that tends to impoverish the region. As indigenous groups are drawn into the larger market system, they have access to new supply sources and consumer outlets, but face competition from other (usually better-off) producers. They begin to lose their subsistence orientation and to overexploit the forest resources. This rational response by individuals to market incentives can lead to the degradation of commonly held property.

Most development programs for the Amazon stress the need to link the region to national markets (Goodland 1985:27). This is the primary justification for roads and other infrastructural investments. Subsistence-level production that does not create surplus is irrelevant to the criteria imposed by growth-oriented development approaches (Alvim 1980:34; Painter et al.

1984:9); nor does an orientation to local or regional markets, to increase self-sufficiency, justify settlement of new lands. Instead, development policies have favored large-scale producers of export crops, to the detriment of small-farmer agriculture. Precisely these industrial groups are responsible for most of the forest clearing (Browder 1985). Yet some productive systems, such as pasture for cattle, are profitable only through speculation on the land market (Hecht 1985), even with hefty government subsidies (Browder 1985).

Small farmers who produce food crops are unable to reap adequate returns on the market; they also end up overexploiting their natural resource base. Amazonian colonists are hampered by initial poverty, unfavorable market integration, and institutional relationships (credit, technical assistance, tilling) that often lead to a cycle of indebtedness and environmental degradation (cf. Collins 1986). The need for cash both leads to off-farm activities that compete with resource management, and forces farmers to intensify short-term production through shortened fallows or monocropping, especially in pasture.

If farmers have a good harvest they are likely to lack adequate transportation and storage systems, and to face prices controlled by middlemen. If prices go high enough to compensate for the costs of production, their products are still unable to compete with goods produced elsewhere, where costs are lower. As a result, most frontier areas import, rather than export, food. Small farmers rarely have the capital to invest in inputs that might counteract the adverse environmental effects of their agricultural enterprises, and even if they did, to do so would be irrational, given the insecurity of land tenure and the poor market prospects. The overexploitation of land, leading to degradation of soils, is a rational short-term solution to the market-oriented production that drains capital from the producer. For these reasons, many conservationists advocate the improvement of intensive forms of subsistence agriculture as a complement to the market orientation of most development projects (Goodland 1980:12).

### *The State and Civil Society*

Analysts often assume that the malfunctioning of the market system and the violence associated with land conflicts are due to an ineffective presence of the Brazilian state in regulating frontier occupation. Such a view rests on an implicit notion of the state as a neutral arbiter of competing interests. Social tension and bureaucratic inefficiencies are attributed to imperfections in the execution of this moderating role. Studies that make this point call for greater knowledge and resources, or changes in personnel and administrative procedures (e.g., Spears and Ayensu 1984:77).

The political economy approach adopts a more structural perspective, emphasizing the causal relationships between a society's economic base—the form of production and the associated class structure—and the legal institutions and administrative agencies of the state. The primary function of the Brazilian state is to maintain the existing structure of production and distribution, and to ensure the reproduction of the conditions for continued

(or enhanced) private accumulation, rather than to act as an objective arbiter of conflicting claims. The model need not endorse a strict determinism (characteristic of earlier studies) between the needs of private capital and the behavior of public institutions. Indeed, if there were perfect correspondence between the interests of dominant economic classes and the role of the modern state there would be no possibility of alternative policy, and, by extension, little purpose in this chapter.

Contemporary perspectives on the role of the state continue to endorse its class-based character, yet at the same time move away from the idea of a mechanical relationship to the economy (for a review, see Carnoy 1984). Quite apart from meeting the needs of economically powerful groups, the state must also, to one degree or another, attend to the interests of a much broader sector of society if it is to protect its own position. The concept of "relative autonomy" (Althusser and Balibar 1968) labels this indeterminacy between the economic and the political, without altogether abandoning the strong influence of the former over the latter. It provides a way to conceptualize the "degrees of freedom," or the "political openings" that allow us to promote alternative initiatives while, at the same time, retaining a healthy respect for the power that threatened economic groups wield within the realm of politics, planning, and public administration.

The recent development experience in the Amazon amply illustrates the class bias of the Brazilian state. The most consistent trend has favored large investors, beginning with programs of fiscal incentives instituted in 1966. These policies sought to transfer systems of production from other regions of Brazil into the Amazon region, to fill the "empty spaces" where Indians and caboclos carry out their peculiarly Amazonian economic activities. Thus the goal of favoring dominant economic interest groups and their particular systems of production led to the imposition of economic models that were ecologically irrational, if politically rational.

In the 1970s, the government also sponsored some tandem activities oriented to the settlement of small farmers via the Transamazon colonization scheme and the Polonoroeste project in Rondonia. Again, the initiative was motivated by a political need to respond to pressures, this time to small farmers in the drought-ridden northeast or those being pushed out of earlier frontier areas in southern Brazil. Investors wielded their influence through the Association of Amazonian Entrepreneurs to undermine these initiatives. They successfully pushed the arguments that small farmers were a predatory, ecological hazard as well as a retrograde influence standing in the way of progress. Ironically, large-scale cattle ranching was promoted as the proper "vocation" for the region. Yet because pasture deteriorated so quickly, conversion of new forest was more profitable than rehabilitation of existing pasture (Goodland 1980:2). The combination of rising inflation rates and government-sponsored road-building programs made land values in the region increase rapidly even if productivity was declining. The productive capacity of land was secondary to its potentials for resale and for obtaining access to federal subsidies and such other forms of wealth as minerals and lumber (Hecht 1985).

The political strength of these entrepreneurial groups is such that the policies favoring pasture investments have changed little. The Second National Development Plan restricted the fiscal incentives for cattle ranches to certain areas of the Amazon where large-scale ranches already predominated (Hecht 1985:673), but this turned out to represent only a temporary setback for large investors, since the next policy initiative gave priority to private colonization projects. The new approach meant, in effect, abandoning the earlier commitment to public distribution of land to poor farmers in favor of procedures that would permit private firms to purchase large tracts and sell subdivided plots to migrants with economic resources. This sudden shift from one policy constituency to another was in large part responsible for the increase in land conflicts between squatters and investors in some parts of Amazonia.

In retrospect, it is hard to point to any of these development strategies as being very successful in the Amazon. The Transamazon scheme was rapidly abandoned after being beset by a variety of problems (Moran 1981; Smith 1982; Wood and Schmink 1978). Private colonists seem to do little better, as the purchase of land and the costs of establishing a farm leave them as decapitalized as the official colonists (Butler 1985). Neither have large investors delivered on their promises: while some enterprises are productive, the economics of investment in the region has encouraged most to make their profits through market manipulation or through speculation in land or short-term capital markets (Hecht 1985; Browder 1986). The government has been left with a legacy of persistent tensions over land that has required increasing military intervention (Schmink 1982). The failure of land regulatory agencies to resolve these problems has given way to "crisis colonization" schemes, directed by the military intelligence establishment. These programs have relied on massive distribution of smaller plots of land in order to accommodate a larger number of settlers and quickly remove disputed land from the public domain. Officials in these agencies admit that the smaller lots are probably not viable over the long term, but their concern is primarily political, not ecological. The strategy has increased population pressure and accelerated the land market in areas of greatest tension.

That politics prevails over technical considerations is often attributed to the lack of adequate understanding of tropical ecology. Such a conclusion presumes that cognitive understanding—this time on the part of government planners—is the determining factor in land use planning, a conclusion not borne out by the evidence. In Brazil, for example, a blue-ribbon commission in 1979–1980 proposed a comprehensive plan for the zoning of the Amazon. The project constituted the first attempt to plan on the basis of technical, scientific criteria. When the plan was made public, adverse reaction from political and economic groups, who viewed it as a threat to their interests in the region, promptly killed the initiative. The short history of the zoning plan attests to the fact that expertise, although a necessary component of effective project design, is hardly sufficient. However well-conceived a project

may be on technical grounds, its success is contingent on a receptive political environment.

### *Global Interdependence*

Having stressed the economic and political nature of development and land policy, we must further note that the content of those policies is often stimulated or constrained by factors that lie well beyond Brazil's borders. The Amazon, for example, has been tied to the world economy since the sixteenth century. The extraction of forest products, especially the harvest of natural latex in the late nineteenth and early twentieth centuries, was associated with the demand for commodities in other parts of the world. As Bunker (1985:25) notes, extractive systems are inherently unstable. In most cases, per unit costs tend to rise as the scale of extraction increases, since commodities must be sought in more distant and difficult locations. Rising costs mean that sources elsewhere are substituted, leading to economic decline. The "boom and bust" cycles that shook Amazonia created little in the way of social or ecological structures capable of fostering long-term development compatible with the regional environment.

During the early period of Brazil's industrialization, the Amazon was essentially a backwater region. But the aggressive road-building schemes of the 1950s and 1960s, linked to the expanding automobile industry in southern Brazil, soon ended the region's isolation. Beginning in the 1960s explicit government policies sought to transfer the capital generated in southern industry to the Amazon region, hoping to create additional export earnings. Notions of the Amazon as a producer of cheap food, as a "safety valve" for excess population, or a "resource frontier" for export, indicate the various roles the region was to play in the overall development plan of Brazil (and of most other Amazonian countries). These imperatives were a response to the transformations and socioeconomic dislocations in the country's economy and to its new role in the world economic system.

In the 1980s the foreign debt burden has placed severe constraints on economic planning possibilities of many Latin American countries, especially Brazil. Under the crisis circumstance there is little choice but to view the region as a potential source of export commodities (including lumber, gold, iron ore, and other minerals) to be plundered as rapidly as possible, and as the site of vast development projects (such as Carajas and Polonoeste) by which new foreign loans may be floated. Conversion of land from food crop to export crop production in other parts of Brazil also contributes to the migrant stream into Amazonia because it leads to land concentration and the expulsion of former food producers. Yet the most promising export crops, such as coffee and cacao, are still subject to price fluctuations on the world market. Furthermore, in the short- and medium-term it seems unlikely that the massive state projects will provide a solution to the debt problem (Mendes 1985:46; Pinto 1982). Given the constraints imposed by the debt situation, however, economic policy must concentrate on the short-

term export possibilities to the detriment of a more sustainable long-term strategy.

On the positive side, recent experience has shown that pressures from international lobby groups can influence the direction of land-use policies. The prestige of the international scientific community and the political lobbying of conservation organizations have helped to create support for initiatives within Brazil to evaluate the appropriateness of land-use models. The outstanding example is that of the World Bank's explicit recognition of environmental issues and indigenous rights as lending criteria. Especially important is the Bank's willingness to back up these conditions with effective material sanctions (as in the case of the Polonoroeste project in Rondonia). These actions may set a precedent for other lenders and provide some concrete lessons in political strategy.

### *Ideology*

Class societies evolve belief systems that morally justify existing social and economic arrangements and, hence, preserve the privileges of dominant groups. There is thus an economic and a political side to the formation of idea-systems that, once produced, become weapons in the clash of social interests (Wolf 1982:390). We use the term "ideology" to refer to such ideas, noting their functional relationship to the organization of production and distribution and to the interests of particular social classes.

In the nineteenth and early twentieth centuries, when Brazil was a thoroughly agrarian society, landed elites embraced Ricardo's law of comparative advantage, which saw in the export of agricultural commodities the road to wealth and progress. The ascendance in the 1930s of new economic and political groups, whose fortunes were bound to urban-based manufacturing, forged a different development strategy that put exclusive faith in the expansion of industrial production. The present-day "growth-mania" for which Brazil is internationally known began during this period, and was later formalized by growth models (from Keynes to Rostow) that sought to maximize annual aggregate real output (GNP—gross national product).

The single-minded obsession with increasing GNP, and an uncritical faith in the idea that growth would lead to the Rostovian notion of "economic takeoff," put environmental concerns squarely in the category of transitory social costs. Brazil's representative to the 1972 Stockholm Conference on the Human Environment explicitly held this view (Goodland 1985:5). The United States, England, and Japan, he claimed, had already polluted the environment and, so doing, became developed. Brazil, he argued, could ill afford the "luxury" of environmental preoccupations until the country reached a similar stage.

The accepted growth paradigm is invoked by specific groups whenever they find its precepts compatible with their interests. For the social scientist, this basic principle goes a long way in clarifying the content of the debate in the sphere of Amazonian development policy. Fiscal and credit incentives

for cattle ranching, the switch to private rather than public colonization schemes, investment in large-scale projects—all of these initiatives and many others are justified on the grounds of their contribution to GNP.

It is the power of ideology that makes the validity of these arguments, and their respective project manifestations, seem thoroughly self-evident. Calls for a more equitable distribution of land or income, programs to set aside large tracts of land for indigenous groups, proposals to pay attention to environmental degradation—any ideas or policies that run counter to assumptions embedded in dominant ideology (and which threaten the position of vested interest groups) at best receive little attention. At worst, the ideas are labeled "subversive" and their proponents silenced by the repressive arm of the state (Schmink 1982).

Even environmental reasoning can be a useful weapon in the struggle to bend state policy to the needs of private accumulation. The *Second Development Plan for Amazonia* (1975–1979), for example, was heavily influenced by the political pressures brought to bear by business interests. The Plan explicitly disavowed the government's earlier commitment to small-farmer colonization projects in favor of the more "rational" and "less predatory" form of occupation to be achieved by backing private entrepreneurs. According to the Plan, the "indiscriminate migration" to the region of poorly educated groups who employ rudimentary technology, far from contributing to the development of the Amazon, only "exacerbates ecological damage to natural resources" (SUDAM 1976:13). By implication, large-scale, highly technical investments by private business are rational, non-predatory and ecologically sound. This argument was bolstered by studies that showed that pasture actually improved soil nutrients, a claim that has not withstood more detailed research (Jordan 1985; Hecht 1985).

The end of the Brazilian miracle in the mid-1970s, the economic decline of the 1980s, and the gradual opening up of political debate during this period stimulated the beginnings of a conservation movement in Brazil. Growing popular concern was reflected in the creation of a Special Environmental Secretariat and the passage of a comprehensive National Environmental Policy in 1981 (Goodland 1985:5). A number of parks and reserves have been established, and the environmental impact of some major development projects is now being monitored. These are important steps, although their impact on the overall pattern of deforestation has so far been small. A sobering economic climate and a return to a democratic political system make this a propitious time to reformulate current development models so that land occupation and resource use in Amazonia will become more consistent with long-term sustainability.

Any attempt to modify the manner of exploiting the natural environment must necessarily confront both structural and ideological opposition. Ideas are never "innocent." Mental conceptions, including belief systems, morality, philosophy, and law, either reinforce or challenge existing social and economic arrangements. And they do so actively, as biased participants in sociopolitical intercourse. From these sets of assumptions it follows that development and

resource management initiatives that seek to moderate the biophysical degradation inherent in unchecked economic accumulation can prevail only if strategically promoted on the basis of a realistic assessment of the strengths and the vulnerabilities of the projects' material and ideological opponents.

### Policy Scenarios

To summarize, in modern social systems characterized by expanded production, the way in which natural resources are exploited is largely determined by the imperatives of private accumulation. Associated with a given structure of production and accumulation is a complex array of social classes and interest groups, each possessing varying degrees of social power. Compared to subordinate classes, those groups that occupy positions of wealth and privilege also command a greater voice in the realm of politics and public policy. Hence, the institutions and agencies of the state, as well as the corresponding ideological assumptions that justify state action (or inaction), tend to cater to the needs of the dominant classes.

Environmental policies and resource management projects that seek to protect the long-term sustainability of the biophysical system often run counter to the logic of private accumulation and, as a consequence, to the interests of powerful social actors. Thus, any attempt to modify the human exploitation of the natural environment in ways that entail the redistribution of costs and such benefits as access to resources and to forms of production must inevitably contend with a wide range of economic, political, and ideological factors. It is our contention that we can enhance the chances of successful intervention if these sociopolitical considerations are explicitly incorporated into the design and the execution of environmental policy.

The methodological agenda we propose begins with defining a specific policy goal(s) for a particular place. The objective may be environmental (conservation of species) or socioeconomic (small-farmer production) or, as is often the case, may simultaneously include several different goals. Indeed, Amazon development policies have often endorsed conflicting goals, as noted earlier. The failure squarely to address the potential conflicts in goal definition has predisposed many costly programs to failure. In the case of the Transamazon colonization project, for example, the fundamental contradiction between social goals (distribution of land to resource-poor settlers) and economic objectives (increasing agricultural production) was a major, and ultimately fatal, flaw in the project design. While administrators selected colonists on the basis of region of origin, large family size, lack of other property, and individual need, evaluators later assessed project success in terms of performance in agricultural production. The latter form of success was more adequately predicted by other factors, such as previous management experience and ownership of durable goods (Moran 1981).

A clear definition of policy goals, and the choices, contradictions, and trade-offs they imply, is ultimately a political question, one that will be determined in the broader socioeconomic arena. Nonetheless, a careful

screening of initial goals will help to identify the areas where choices or compromises will be required.

The second step in the strategy is to examine the existing system of resource exploitation in the area to be affected by the proposed policy. The procedure involves what Vayda (1983) calls a "progressive contextualization." It begins by focusing on significant human activities or people/environment interactions (e.g., land clearing, timber cutting, mining, hunting), and then explains such interactions by placing them within progressively wider contexts. The process starts with an analysis of a specific activity performed by particular people in a given place, then traces the causes and the effects of these activities outwards. In so doing the strategy is committed to the holistic premise that an empirically observed behavioral phenomenon can be understood only if the particular event is seen as part of the larger social, economic, and political context.

We believe (in contrast to Vayda, who shuns the use of any a priori framework) that the concepts and relationships comprising the political economy perspective are useful in organizing this "contextualizing" analysis. The analysis makes use of economics, history, and the social sciences to investigate the various forms of economic activity in a given region, to identify the social groups involved in each activity, and to understand how these groups appropriate different aspects of the natural environment. A political economy perspective further draws attention to the relationships between different social groups and to the potential for conflicts which, in turn, may have important consequences for the natural environment. The investigation at this stage also relies on ecology and the natural sciences to specify the environmental impact of the forms of extraction and production associated with the various economic activities.

The third step is to analyze the content of project goals in relation to what is known about existing systems. Which elements of those systems seem to be compatible with the goals defined at the outset, and which would have to be changed? Such questions must be addressed even in the absence of complete information about either the social or physical sphere. It is therefore useful at this stage to proceed by proposing alternative scenarios, each of which implies a different set of recommendations. The range of acceptable divergence from project goals should also be defined. Tools such as the concept of carrying capacity may be useful in defining the limits of policy options, provided they integrate both socioeconomic and environmental variations (Fearnside 1986).

We can expect the policy recommendations derived from alternative scenarios to affect in different ways the material interests of the social groups associated with the existing organization of production. The fourth step, therefore, is to "map" the sociopolitical structure, identifying the classes and interest groups likely to be helped or hurt by the recommended change in resource use. At this stage, consultation with planners, with the local population, and with others likely to be affected by the proposed scenarios (such as bankers and exporters) will provide crucial information. The potential

interactions, conflicts, and trade-offs identified in the earlier assessment of existing resource-use patterns will point to key areas of concern at this stage. Issues of growth versus sustainability, large versus small enterprises, public versus private sector, and redistribution versus accumulation must be scrutinized in relation to the policy choices at hand. If the goal is creation of stable regional markets, should incentives for large cattle enterprises oriented primarily to markets outside the Amazon be phased out? Are there ways to incorporate different goals, which benefit distinct social groups, into a more complex approach? An important aspect of this stage is to assess the magnitude of the economic, political, and ideological resources available to potential supporters and opponents of the proposed policy alternatives. If competing or conflicting policy objectives are to be addressed, institutional mechanisms must be found to support the claims of less-powerful constituencies, such as peasant and native groups.

The final step in formulating an intervention strategy can be thought of as a bargaining process. On one side are the desiderata of a proposed resource-use model that has been refined and assessed through the approach outlined above. Weighed against the defined objectives are the ecological, economic, and sociopolitical obstacles to the changes required to achieve them. Actual policy is the outcome of a process of successive compromises. Initial concessions are made to the interest groups over which one has no control, and to the major constraints that cannot be changed. Each modification of this type will require a reevaluation of goals, outcomes, and costs. The final stage will be reached when the intervention strategy is within the range of feasible options. What can be realistically endorsed will depend on the assessment of the resources available, on the relative strengths of the various interests arrayed on both sides, and, in general, on the prospects for success given anticipated obstacles. By avoiding the abstractions of "ideal" or "optimum" goals, such a pragmatic view of the evaluation of policy scenarios provides the basis for the tough choices and creative thinking required to improve development policy in the Amazon and elsewhere.

### Notes

1. Others have called for a "political ecology" perspective (e.g., Hjort 1982) but no one, to our knowledge, has developed one.

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